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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/664,405	Applicant(s) DRAKE ET AL.	
	Examiner ROBERT HODGE	Art Unit 1729	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-22 is/are pending in the application.
- 4a) Of the above claim(s) 2-7 and 18-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8-12 and 14-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 12/13/10 have been fully considered but they are not persuasive. Applicants first argue that Lindbeck does not describe or render obvious a housing for a liquid oxidizable fuel as was recited in claim 1, which now recites that the housing "defining an interior space, with the interior space confining a liquid, oxidizable fuel". Throughout the entire Lindbeck reference the term liquid fuel is used numerous times and one example of the liquid fuel is gasoline. Lindbeck further discloses in column 4, lines 46 et seq. that the liquid fuel flows in a downward direction, where some of the fuel turns into fumes and any fuel that is not changed into fumes falls to the bottom of the generator tank 12 to be collected and can be periodically drained away by removal of the drain plug 78. Therefore generator tank 12 is not only fully capable of storing liquid fuel, it is in fact storing liquid fuel as disclosed by Lindbeck. Applicants then argue that Lindbeck does not disclose a "fuel egress port" and state the egress port as used in claim 1 refers to a port that provides a pathway for egress or exit of fuel from the housing. Said argument is not commensurate with the scope of the instant claims since claim 1 only recites "a fuel egress port supported by the housing, providing egress of fuel from the interior space of the housing". There is nothing in instant claim 1 that requires the fuel to exit the housing as applicants allege. Said argument is also based on a functional limitation versus a structural limitation. However as seen in figure 1 of Lindbeck the fuel egress port 24 is centrally located at an interior location of the housing, the fuel exits the egress port 24 at an orifice 40 which is part of the egress port

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24 wherein the fuel leaves the central interior space of the housing to an annular space within the housing. Therefore Lindbeck is not only capable of egressing the fuel from the interior space of the housing, Lindbeck explicitly discloses that the fuel egresses from the interior space of the housing to an annular space of the housing, especially when giving the claim terms their broadest most reasonable interpretation. Applicants state that Delaney does not make up for the supposed deficiencies of Lindbeck.

However Lindbeck does not have the supposed deficiencies as clarified above.

Applicants argue another functional limitation in instant claim 12 stating that Yonetsu does not teach a “fuel egress port configured to pass fuel in vapor phase”, because Yonetsu teaches a path. Again applicants have failed to define in the instantly claimed invention in terms of structure and have rather chosen to use function instead. As was already stated in the office action dated 8/12/10, a material worked upon by a structure does not impart patentability to the claims and expressions relating to the contents of an apparatus during an intended operation are of no significance in determining patentability of apparatus claims. Furthermore there is nothing in claim 12 that states that all of the fuel in its entirety must be a vapor phase the entire time or where specifically it must be in a vapor phase. Yonetsu teaches vaporizing the fuel at vaporization plate “a” which is part of the path 3 and because vaporization occurs at vaporization plate “a”, not only is Yonetsu capable of the functional limitations, Yonetsu actually explicitly discloses the function as recited in the instant claims. Applicants further state that Yonetsu teaches away from the addition of the resistive heating element because Yonetsu supposedly only provides a vapor phase in the unit cell of the

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stacked body (of the fuel cell) and not in the cartridge. It is unclear what applicants are referring to as the cartridge. In the grounds of rejection applicants were referred to figures 13-14B as showing the interior of the cartridge. As seen in these figures everything is a single solitary whole unit and therefore the entire device is considered a cartridge given the broadest most reasonable interpretation of the instant claim terms. Therefore because Yonetsu teaches vaporizing the fuel in the "egress port" in the "cartridge" it still reads on the claims as recited above.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that Tsoi-Hei and Gore do not teach "a fuel egress port...configured to pass fuel in vapor phase", the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Applicants' arguments regarding the Obviousness type Double Patenting rejection are still not persuasive for all the reasons already made of record.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 8-11 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the amendment filed 12/13/10 applicants amended claim 1 to recite that the "resistive heating element disposed in the fuel egress port configured to produce heat and provide a concomitant increase in a vaporization rate of fuel from the housing". It is unclear how the resistive heating element is "configured" to both produce heat as well as provide a concomitant increase in a vaporization rate of fuel from the housing. It is clear that a resistive heating element produces heat because that is what they are structurally designed to do. However it is not clear how a resistive heating element can provide a concomitant increase in vaporization rate of fuel from the housing via its simplistic structure. The Examiner has looked to the instant specification for guidance regarding the recitation of this configuration and has found no guidance regarding said recitation with regards to a resistive heating element. Therefore amended claim 1 and its dependent claims are indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,338,907 hereinafter Lindbeck.

As seen in figure 1, Lindbeck teaches a fuel cartridge 10 comprising a housing 12, defining an interior space which confines liquid oxidizable fuel (column 4, line 37 – column 5, line 12), a fuel egress port 24 supported by the housing, which provides egress of fuel from the interior space of the housing to an annular space of the housing, and a resistive heating element 28 disposed in the fuel egress port, wherein the resistive heating element is a wire that is disposed in thermal communication with the interior of the cartridge and it spaces a vapor portion of the cartridge (column 3, line 26 – column 4, line 9).

Regarding claims 1 and 8:

“Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim.” *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, “[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims.” *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

Therefore no patentable weight has been given to the use of the fuel cartridge or the contents contained therein, see MPEP 2115. Furthermore because all of the instantly claimed structure has been found in Lindbeck, the apparatus of Lindbeck is full capable of functional recitations in the instant claims.

Claims 1 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,684,786 hereinafter Mann.

As seen in the figures 1, Mann teaches a fuel cartridge 12 comprising a housing 17, defining an interior space which confines liquid oxidizable fuel, a fuel egress port 22 or 40 supported by the housing, which provides egress of fuel from the interior space of the housing to an external space of the housing (i.e. the fuel exits the housing), and a resistive heating element 26 or 70 disposed in the fuel egress port, wherein the resistive heating element is a wire that is disposed in thermal communication with the interior of the cartridge and it spaces a vapor portion of the cartridge (i.e. head space) (whole document).

Regarding claims 1 and 8:

"Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim." *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d 996, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

Therefore no patentable weight has been given to the use of the fuel cartridge or the contents contained therein, see MPEP 2115. Furthermore because all of the instantly claimed structure has been found in Lindbeck, the apparatus of Lindbeck is full capable of functional recitations in the instant claims.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindbeck as applied to claim 1 above, and further in view of U.S. Pre-Grant Publication No. 2005/0031522 hereinafter Delaney.

Assuming *arguendo* that patentable weight is given to the intended use and the material worked upon in claim 8, Lindbeck teaches that the liquid fuel in the fuel cartridge is vaporized and the liquid fuel can be a hydrocarbon such as gasoline (see citations above).

Delaney teaches that hydrocarbon direct fuel cells use methanol, ethanol, diesel and/or gasoline as fuel.

Therefore it would have been obvious at the time of the invention to one having ordinary skill in the art to feed the vaporized gasoline from the fuel cartridge of Lindbeck to a hydrocarbon direct fuel cell as taught by Delaney since the claimed subject matter merely combines familiar elements (feeding a hydrocarbon such as gasoline to a hydrocarbon direct fuel cell that uses gasoline as a fuel) according to known methods and does no more than yield predictable results. See MPEP 2141 (III) Rationale A, KSR v. Teleflex (Supreme Court 2007).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mann as applied to claim 1 above, and further in view of U.S. Pre-Grant Publication No. 2005/0031522 hereinafter Delaney.

Assuming *arguendo* that patentable weight is given to the intended use and the material worked upon in claim 8, Mann teaches that the liquid fuel in the fuel cartridge is can be a hydrocarbon such as diesel (see citations above).

Delaney teaches that hydrocarbon direct fuel cells use methanol, ethanol, diesel and/or gasoline as fuel.

Therefore it would have been obvious at the time of the invention to one having ordinary skill in the art to feed the diesel from the fuel cartridge of Mann to a hydrocarbon direct fuel cell as taught by Delaney since the claimed subject matter merely combines familiar elements (feeding a hydrocarbon such as gasoline to a hydrocarbon direct fuel cell that uses gasoline as a fuel) according to known methods and does no more than yield predictable results. See MPEP 2141 (III) Rationale A, KSR v. Teleflex (Supreme Court 2007).

Claims 12, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,506,513 hereinafter Yonetsu in view of GB 2 263 501 hereinafter Tsoi-Hei.

As seen in the figures, Yonetsu teaches a fuel cartridge, that is prismatic in shape, having a housing 1, a fuel egress port 3 that contains a heat producing element "a" (i.e. porous carbon vaporizing plate, Figure 2, column 13, lines 16-20), which is also in the interior of the cartridge (figures 13-14B) and spaces a vapor portion of the cartridge from a liquid reservoir of the cartridge, a bladder 16 (figure 7B) that holds a liquid fuel 7 such as methanol (column 5, lines 4-8) that is supplied to a direct methanol

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fuel cell 2 (column 2, line 34 – column 3, line 19, column 4, line 26 – column 5, line 35 and column 7, line 47 – column 7 line 62).

Furthermore in column 4, line 50 Yonetsu clearly discloses that the pathway 3 is filled with a porous material through which the liquid fuel permeates (also called a fine tube that performs capillary function as admitted to by Applicants in the Remarks field 11/4/09) and the porous material is in fluid communication and fluidly connected to the liquid fuel holding material called a receiver 5, where the fuel is vaporized before entering the unit cell. Therefore the entire path that the fuel flows through before it is vaporized at the vaporization plate "a" is considered the "egress port" and since the receiver 5 is completely disposed on the vaporization plate "a" the vaporization plate "a" is disposed in the path of the fuel being supplied and is therefore "disposed in the fuel egress port" as recited in instant claim 1.

Yonetsu further teaches in figure 7A a piston 30 (i.e. fuel sealing part) urged against the fuel via spring 14 (column 7, lines 48-62).

Yonetsu does not teach the piston and the bladder in the same embodiment.

At the time of the invention it would have been obvious to one having ordinary skill in the art to combine the embodiments of figures 7A and 7B of Yonetsu in order to provide a fuel cartridge with multiple solutions for properly containing the methanol fuel as well as providing sufficient means to push out the fuel through the fuel outlet port thereby providing the necessary fuel to the fuel cell in order for the fuel cell to operate. The above combination such as a piston urged against a bladder, according to known methods by Yonetsu yields the predictable result of providing a sufficient means to push

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out the fuel through the fuel outlet port thereby providing the necessary fuel to the fuel cell in order for the fuel cell to operate. See MPEP 2141 (III) Rationale A, KSR v. Teleflex (Supreme Court 2007). See also Boston Scientific Inc. v. Cordis Corp. (Fed. Cir. 2009) 89 USPQ2d 1704.

Yonetsu does not teach that the porous carbon vaporization plate is a resistive heating element.

Tsoi-Hei teaches a porous carbon heating element 22 (i.e. resistive heating element) that is connected to two electrodes 18a and 18b, which supply the porous carbon heating element electrical current that causes the porous carbon heating element to produce heat and to vaporize liquid fuel that is supplied to the porous carbon heating element (page 4, line 26 – page 5, line 6 and page 6, lines 6-30).

At the time of the invention it would have been obvious to one having ordinary skill in the art to use a porous carbon heating element in place of the porous carbon vaporization plate in Yonetsu as taught by Tsoi-Hei in order to provide a vaporizer that provides a well prepared charge, stores a minimal amount of fuel, permits accurate fuel metering and that minimizes the effect of wall wetting, thereby enabling a completely vaporized fuel stream to the fuel cell that is subsequently preheated that will not lower the temperature of the fuel cell when it is supplied to the fuel cell such that the fuel cell will operate at its optimal operating temperature. Simple substitution of one known element (a porous carbon heating element) for another (a porous carbon vaporizing plate) would achieve the predictable results of providing a vaporizer provides a well prepared charge, stores a minimal amount of fuel, permits accurate fuel metering and

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that minimizes the effect of wall wetting, thereby enabling a completely vaporized fuel stream to the fuel cell that is subsequently preheated that will not lower the temperature of the fuel cell when it is supplied to the fuel cell such that the fuel cell will operate at its optimal operating temperature. See MPEP 2141 (III) Rationale B, KSR v. Teleflex (Supreme Court 2007).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yonetsu in view of Tsoi-Hei as applied to claim 12 above, and further in view of Gore.

Yonetsu does not teach a battery to power the heat-producing element.

As seen in figures 2 and 2A-2C, Gore teaches a fuel cartridge 206 having a housing 230, a heat producing element (i.e. wire) 208, disposed in the cartridge and in thermal communication with the cartridge (paragraphs [0039]-[0051]). Gore further teaches powering the heat-producing element with a battery (paragraph [0031]).

At the time of the invention it would have been obvious to one having ordinary skill in the art to use a battery to power the heat-producing element in the fuel cartridge of Yonetsu as modified by Tsoi-Hei as taught by Gore in order to provide a system that can power the heat-producing element on demand when a sufficient electric load is not available from the fuel cell such as at startup in order to vaporize the methanol in the cartridge before entering the anode of the direct methanol fuel cell of Yonetsu as modified by Tsoi-Hei especially during startup when the fuel cell is cold, so that the rate of reaction can be accelerated in the direct methanol fuel cell of Yonetsu as modified by Tsoi-Hei thus increasing the overall efficiency of the cartridge and fuel cell system of Yonetsu as modified by Tsoi-Hei. If a technique has been used to improve one device

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(using a battery to power the heat-producing element in a fuel cartridge), and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way (providing a system that can power the heat-producing element on demand when a sufficient electric load is not available from the fuel cell such as at startup in order to vaporize the methanol in the cartridge before entering the anode of the direct methanol fuel cell especially during startup when the fuel cell is cold so that the rate of reaction can be accelerated in the direct methanol fuel cell thus increasing the overall efficiency of the cartridge and fuel cell system), using the technique is obvious unless its actual application is beyond his or her skill. See MPEP 2141 (III) Rationale C, *KSR v. Teleflex* (Supreme Court 2007).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 8, 12 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 11 and 12 of copending Application No. 10/664,818. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of copending Application No. 10/664,818 fully encompass the scope of instant claims the only difference is the instant claims provide further structure which has been found in the prior art.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HODGE whose telephone number is (571)272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula Ruddock can be reached on (571) 272-1481. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Hodge/
Primary Examiner, Art Unit 1729